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REMARKS

Claims 1-36 are pending in this application. The Examiner rejected Claims 1-36. In particular, the Examiner rejected Claims 5, 14, 15, and 21 under 35 U.S.C. § 112, second paragraph. The Examiner further rejected Claims 1-4, and 6-36 under 35 U.S.C. § 103 as being unpatentable over U.S. Patent No. 5,999,630 ("the Iwamatsu patent") in view of U.S. Patent No. 4,739,514 ("the Short patent"). The Examiner further rejected Claim 5 under 35 U.S.C. § 103 as being unpatentable over U.S. Patent No. 5,208,493 ("the Lendaro patent") in view of U.S. Patent No. 5,400,405 ("the Petroff patent"). The Examiner further objected to Claim 21 as being of improper dependent form.

Further, the Examiner objected to the drawings because of deficiencies. Further, the Examiner objected to the specification because of informalities.

By this amendment, Applicant has amended the specification, the drawings, and Claims 1, 4, 5, 6, 14, 15, 20, 21, 26, and 30-36. Reconsideration of the application, as amended, is respectfully requested.

THE SPECIFICATION

The Examiner objected to the specification because of informalities. The Examiner noted the following minor inconsistencies in the specification:

- at page 24, lines 21-23, the description is inconsistent with Fig. 6C;
- at page 24, line 28, "622" appears to be a typographical error for --122--;
- at page 25, line 6, "162" ...--622--;
- at page 25, line 14, "522" ... --122--;
- at page 25, line 26, "equations 1 and 2 above" are referred to, but appear to be absent;
- at page 26, line 29, "120 kHz" appears to be a typographical error for --20 kHz--;
- at page 35, line 6, a "fifth bandpass filter 1414" is referred to in Fig. 14, but not shown;
- at page 35, line 19, "throw" appears to be a typographical error for --pole--;
- page 35, line 19, "throw" appears to be a typographical error for --pole--;
- page 35, line 27 refers to "switch 1419", absent from Fig. 14;
- page 36, lines 25 and 26 refer to switch 1505, not illustrated;

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at page 36, line 27, "40"; [Applicant believes "40" is correct and "60" is incorrect.]
at page 36, line 31, "40, 60, and 100 Hz";
at page 37, lines 2-3, "60, 100 and 150 Hz";
at page 37, lines 7-8 and 11, "40, 60, 100, and 150 Hz";
page 37, lines 24-28 indicates that the gain is increased in response to either an increase or a decrease in the detected envelope amplitude;
at page 38, lines 17 et seq., elements 1742 and 1746-1750 are referred to in Fig. 16, but not shown; [Applicant believes the Examiner is referring to Fig. 17.]
at page 40, line 25, "1418" and "1420";
at page 41, lines 21 et seq., "1914", "1916", and "1917";
at page 44, line 31, "output buffers 2006";
at page 45, lines 13 and 17, "non-inverting";
at page 44, line 19, "2108"; [Applicant believes that the Examiner is referring to page 45.]
at page 46, lines 9 et seq., "2125 Hz", "21.8 kHz";
at page 46, lines 27-28, "120 kHz";
at page 52, line 10, "FET 2814";
at page 52, line 11, "pin P10".

With respect to the first informality, Applicants find the description in the specification on page 24, lines 21-23 consistent with Figure 6C. The curves in Figure 6C are approximately 0 dB from approximately 20 Hz to approximately 1 kHz, which is the stop band. The curves have the greatest negative slope between approximately 1 kHz and approximately 10 kHz, which is the transition band. Further, the curves are approximately flat from approximately 10 kHz to 20 kHz, which is the pass band.

With respect to the remaining informalities, the above amendment to the specification and amendments to the drawings correct these informalities. In addition, Applicants has corrected additional minor errors in the above amendment to the specification.

The Examiner further notes that incorporating subject matter into the application by reference to non-patent publications by Shaw and Mehrgardt et al. at page 48 lines

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1-7 is improper. Applicant has corrected this by removing the phrase ""both of which are incorporated herein by reference as though fully set forth" on page 48 lines 6-7.

Applicant respectfully submits that no new matter is being introduced by way of this Amendment and requests that the foregoing Amendment to the specification be entered and made of record.

RESPONSE TO DRAWING OBJECTIONS

In the Notice of Draftsperson's Patent Drawing Review attached to the Office Action, the Draftsperson objected to Figures 5, 19, 27, 34, and 38 as having improper margins. Further, the Draftsperson objected to Figure 37 as having non-uniform lines and numbers. Further, the Draftsperson objected to Figures 39-44 as having gray shading. Further, the Draftsperson objected to Figures 37-44 as having numbers letters and reference characters less than .32 cm in height. Further, the Draftsperson objected to the box around and legend title of Figures 39-44.

Applicant acknowledges the drawing informalities noted in the Notice of Draftsperson's Patent Drawing Review.

In addition, some of the inconsistencies the Examiner noted in the specification are also inconsistencies found in the drawings. Further, the applicant has also identified additional drawing informalities and inconsistencies. The applicant has amended Figures 14, 17, 19, 20, 27-30, 32, 35, 36, 37A, 37B, and 38B as set forth in the attached document entitled "SUBMISSION OF SUBSTITUTE DRAWINGS FOR APPROVAL BY EXAMINER." With the Examiner's approval, formal drawings addressing the inconsistencies and the informalities noted by the Draftsperson, the Examiner, and the Applicant will be prepared and filed upon issuance of a Notice of Allowance.

The modifications are supported throughout the originally filed specification. Accordingly, Applicants respectfully submit that no new matter is introduced by the proposed drawing changes and therefore respectfully request the Examiner to withdraw the objection to the drawings.

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OBJECTIONS TO CLAIM 21

The Examiner objected to Claim 21 as being of improper dependent form for failing to further limit the subject matter of a previous claim. In response, Applicants have amended Claim 21 to depend upon Claim 20. Withdrawal of the objection to Claim 21 as being of improper dependent form is requested.

REJECTION OF CLAIMS 5, 14, 15, and 21 UNDER 35 U.S.C. § 112, SECOND PARAGRAPH

In rejecting Claims 5, 14, 15, and 21 under 35 U.S.C. § 112, second paragraph. The specific rejections made by the Examiner, and Applicants response to these rejections, are discussed below.

Claim 5

With respect to Claim 5, the Examiner has stated the claim recites the limitation "said third fourth" for which there is insufficient antecedent basis for this limitation in the claim. The claim has been amended, without altering its scope, to "said fourth filter" for which there is sufficient antecedent basis for this limitation.

Claim 14

With respect to Claim 14, the Examiner has stated that the claim recites the limitation "said variable gain module" for which there is insufficient antecedent basis for this limitation in the claim. The claim has been amended, without altering its scope, to depend from Claim 13, for which there is sufficient antecedent basis for this limitation.

Claim 15

With respect to Claim 15, the Examiner has stated that the claim recites the limitation "said variable gain circuit" for which there is insufficient antecedent basis for this limitation in the claim. The claim has been amended, without altering its scope, to "said variable gain module" and to depend from Claim 13, for which there is sufficient antecedent basis for this limitation.

Claim 21

With respect to Claim 21, the Examiner has stated that the claim recites "The method of claim 21, wherein" and attempts to depend upon itself. The claim has been amended to depend from Claim 20.

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Applicants respectfully request the Examiner to withdraw the rejection of Claims 5, 14, 15, and 21 under 35 U.S.C. § 112, second paragraph.

REJECTION OF CLAIMS 1-4, and 6-36 UNDER 35 U.S.C. § 103(a)

The Examiner rejected Claims 1-4 and 6-36 under 35 U.S.C. § 103(a) as being unpatentable over Iwamatsu in view of Short. Claims 1, 4, 6, 20, 21, 26, and 30-36 have been amended in order to clarify the features of Applicants' inventions. In view of the above claim amendments and the following discussion, Applicants respectfully traverse this rejection.

Claim 1

Iwamatsu appears to teach a sound image localization controlling circuit designed to localize sound images in any position. Iwamatsu appears to filter delayed left and right input signals with a set of head related transfer functions. The resulting directional outputs for each left and right signal are summed. Any right signal information present in the sum of the left directional output is canceled and any left signal information present in the sum of the right directional output is canceled. See column 5 line 34 through column 6 line 66 and column 7 line 65 through column 8 line 53.

Short appears to disclose an automatic dynamic equalizer. Short appears to teach filtering with a low frequency bandpass filter the compressed input signal and adding the input signal to the filtered compressed signal. See column 2 lines 43-63 and Figure 1.

In contrast, in an embodiment of the invention, an image correction module alters the sound as a first function of frequency over a first frequency range and alters the sound as a second function of frequency over a second frequency range to correct a perceived vertical image of the sound when the sound is reproduced by the loudspeakers, where the first function of frequency is independent of the second function of frequency.

Further in contrast, in an embodiment of the invention, a bass enhancement module produces a perception of low-frequency sound when the sound is reproduced by the loudspeakers.

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Further in contrast, in an embodiment of the invention, an image enhancement module spectrally shapes difference information associated with the sound when the sound is reproduced by loudspeakers.

Neither Iwamatsu nor Short, alone or in combination, discloses an audio correction system that processes a first set of frequencies separately from a second set of frequencies to vertically relocates a sound image, produces the perception of low frequencies, and spectrally shapes difference information associated with the input signals to broaden the sound image.

Neither Iwamatsu nor Short, alone or in combination, discloses an audio correction system that produces the perception of low frequencies. Iwamatsu does not teach a bass enhancement module. Short teaches enhancing filtered bass frequencies to control voice boominess in dynamic equalized sound, but does not teach the perception of low-frequencies to a listener when the speaker system can not adequately reproduce the low frequency sound.

Because the references cited by the Examiner do not disclose, teach or suggest the use of an image correct module to correct the perceived vertical image of sound by altering the sound as first and second functions of frequency where the first and second functions of frequency are independent, a bass enhancement module configured to produce the perception of low frequencies, and a image enhancement module which spectrally shapes difference information associated the sound to horizontally enhance the sound image, Applicant asserts the Claim 1 is not obvious in view of the Iwamatsu and Short references. Applicant therefore respectfully submits that Claim 1 is patentably distinguished over the cited references and Applicant respectfully requests allowance of Claim 1.

Claims 2-4

Claims 2-4, which depend from Claim 1, are believed to be patentable for the same reasons articulated above with respect to Claim 1, and because of the additional features recited therein.

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Claims 6, 20, 34, 35, and 36

As described above, Iwamatsu appears to teach a sound image localization controlling circuit designed to localize sound images in any position and Short appears to disclose an automatic dynamic equalizer.

In contrast, in an embodiment of the invention, a bass enhancement module produces a perception of low-frequency sound when the loudspeakers reproduce the sound.

Neither Iwamatsu nor Short, alone or in combination, discloses an audio correction system that produces the perception of low frequencies. Iwamatsu does not teach a bass enhancement module. Short teaches enhancing filtered bass frequencies to control voice boominess in dynamic equalized sound, but does not teach the perception of low-frequencies to a listener when the speaker system can not adequately reproduce the low frequency sound.

Because the references cited by the Examiner do not disclose, teach or suggest the use of a bass enhancement module configured to produce the perception of low frequencies, Applicant asserts that Claims 6, 20, 34, 35, and 36 are not obvious in view of the Iwamatsu and Short references. Applicant therefore respectfully submits that Claims 6, 20, 34, 35, and 36 are patentably distinguished over the cited references and Applicant respectfully requests allowance of Claims 6, 20, 34, 35, and 36.

Claims 7-19

Claims 7-19, which depend from Claim 6, are believed to be patentable for the same reasons articulated above with respect to Claim 6, and because of the additional features recited therein.

Claims 21-33

Claims 21-33, which depend from Claim 20, are believed to be patentable for the same reasons articulated above with respect to Claim 20, and because of the additional features recited therein.

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REJECTION OF CLAIM 5 UNDER 35 U.S.C. § 103(a)

The Examiner rejected Claim 5 under 35 U.S.C. § 103(a) as being unpatentable over Lendaro in view of Petroff. In view of the following discussion, Applicants respectfully traverse this rejection.

Claim 5

Lendaro appears to disclose a stereo expansion circuit that can be switched on or off. When the expansion circuit is on, Lendaro teaches an expanded left output signal which is the left input signal plus a portion of the difference between the left and right input signals. Similarly, Lendaro teaches an expanded right output signal which is the right input signal minus a portion of the difference between the left and right input signals. Lendaro teaches two differential amplifiers, a feedback resistor for each differential amplifier, a filter to determine the portion of difference signal in the output, a FET switch to enable the expansion circuit, and a control signal to control the FET. See column 2 line 5 through column 3 line 2.

Petroff appears to teach a dual function cross coupling circuit receiving stereo signals and delivering modified stereo signals. Petroff appears to teach two input amplifiers, each with a feedback resistor, a filter to adjust the common mode content of the modified output signals, and a variable resistor to adjust the perceived stereo ambience of the modified output signals. See column 3 line 59 through column 4 line 38.

In contrast, in an embodiment of the invention, the first and second enhanced output signals are configured to produce the perception of low-frequency sound when the output signals are reproduced by the speaker system.

Neither Lendaro, nor Petroff, alone or in combination, discloses an image enhancement system that produces the perception of low-frequency sound to a listener when the speaker system can not adequately reproduce the low frequency sound.

Because the references cited by the Examiner do not disclose, teach or suggest the use of an image enhancement system configured to produce the perception of low frequency sound, Applicant asserts that Claim 5 is not obvious in view of the Lendaro and Petroff references. Applicant therefore respectfully submits that Claim 5 is

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patentably distinguished over the cited references and Applicant respectfully requests allowance of Claim 5.

REQUEST FOR TELEPHONE INTERVIEW

Pursuant to M.P.E.P. § 713.01, in order to expedite prosecution of this application, Applicant's undersigned attorney of record hereby formally requests a telephone interview with the Examiner as soon as the Examiner has considered the effect of the arguments presented above. Applicant's attorney can be reached at (949) 721-2998 or at the number listed below.

CONCLUSION

In view of the forgoing, the present application is believed to be in condition for allowance, and such allowance is respectfully requested. If further issues remain to be resolved, the Examiner is cordially invited to contact the undersigned such that any remaining issues may be promptly resolved. Also, please charge any additional fees, including any fees for additional extension of time, or credit overpayment to Deposit Account No. 11-1410.

Respectfully submitted,

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